

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claim 1 (Currently Amended): A solid state imaging device comprising:

an imaging region including unit cells arranged in a matrix of rows and columns to provide a plurality of pixel rows, each of said unit cells having photoelectric conversion means for photoelectrically converting incident light, applied to pixels, to store signal charges, readout means for reading out stored signal charges to a detection node, and amplifying means for amplifying the readout signal; and

a readout voltage switching circuit ~~setting~~ configured to set a readout driving signal, applied to said readout means, to one of a plurality of voltages different to one another according to internal control, and to set a voltage of said readout driving signal, corresponding to said readout pulse for a dynamic range increase, to a lower voltage than a voltage of a readout driving signal corresponding to a usual readout pulse; and

a pulse production circuit including a vertical shift resistor configured to sequentially generate pulses for a dynamic range control, based on an external input pulse for said dynamic range control.

Claim 2 (Currently Amended): The solid state device according to claim 1, wherein ~~said readout voltage switching circuit sets a voltage of said readout driving signal, corresponding to a readout pulse for dynamic range increase, to a lower voltage than a voltage of said readout driving signal corresponding to a usual readout pulse~~ said pulse production circuit is configured to generate in sequence a readout pulse for dynamic range increase, a pulse for an electronic shutter and a usual readout pulse.

Claim 3 (Currently Amended): The solid state imaging device according to claim 1, wherein said readout voltage switching circuit sets a voltage of said readout driving signal, corresponding to said readout pulse for said a dynamic range increase, to a lower voltage than a voltage of said readout driving signal corresponding to a pulse for an electronic shutter and said voltage of said readout driving signal corresponding to said usual readout pulse.

Claim 4 (Currently Amended): A solid state imaging device comprising:
an imaging region including unit cells arranged in a matrix of rows and columns to provide a plurality of pixel rows, each of said unit cells having photoelectric conversion means for photoelectrically converting incident light, applied to pixels to store signal charges, readout means for reading out stored signal charges at a detection node, and amplifying means for amplifying the readout signal;

a plurality of readout lines provided in a horizontal direction in corresponding to each pixel row in said imaging region, said plurality of readout lines transmitting a readout driving signal for driving each readout means of said unit cells in a corresponding pixel row respectively;

a pulse production circuit for producing a plurality of pulses for respective pixel rows as pulse signals for controlling readout timing in said plurality of pixel rows;

a readout voltage switching circuit for setting a voltage of said readout driving signal, applied to said readout means in correspondence to a part of pulse in said plurality of pulses, to a voltage differ from said voltage of said readout driving signals, applied to said readout means in correspondence to the other pulse in said plurality of pulses; and

a vertical shift resistor for sequentially producing pulses for a dynamic range control, based on an external input pulse for said dynamic range control; and

a plurality of vertical signal lines, provided in correspondence to respective pixel columns in said imaging region, for transmitting a signal provided from said unit cells of said each pixel row in a vertical direction.

Claim 5 (Original): The solid state imaging device according to claim 4, wherein said pulse production circuit generates in sequence a readout pulse for a dynamic range increase and a usual readout pulse as said plurality of pulses, and wherein said readout voltage switching circuit sets a voltage of said readout driving signal, corresponding to a readout pulse for said dynamic range increase, to a lower voltage than a voltage of said readout driving signal corresponding to said usual readout pulse.

Claim 6 (Currently Amended): The solid state imaging device according to claim 4, wherein said pulse production circuit generates in sequence a readout pulse for ~~said~~ an electronic shutter, a readout pulse for ~~said~~ a dynamic range increase and a usual readout pulse as said plurality of pulses, and wherein said readout voltage switching circuit sets a voltage of said readout driving signal, corresponding to a readout pulse for said dynamic range increase, to a lower voltage than a voltage of said readout driving signal corresponding to said readout pulse for said electronic shutter.

Claim 7 (Original): The solid state imaging device according to claim 4, further including:

vertical driving means for selectively supplying said readout driving signal to said plurality of readout lines in correspondence to said plurality of pulses supplied from said pulse production circuit, thereby driving said readout means of each pixel row in said imaging region for several times.

Claim 8 (Original): The solid state imaging device according to claim 7, wherein said vertical driving means provides a plurality of readout driving signals, corresponding to respective said plurality of pulses, during any horizontal driving periods.

Claim 9 (Original): The solid state imaging device according to claim 7, further including:

AD converter for converting signals, transmitted to said plurality of vertical signal lines, to digital signals;

said vertical driving means providing at least one of said readout driving signal, corresponding to said plurality of pulses, during effective horizontal periods; and

said AD converter being controlled in such a manner that signal conversion is stopped when said readout driving signal is provided during said effective horizontal periods.

Claim 10 (Original): The solid state imaging device according to claim 7, wherein said imaging region further includes reset means for resetting a detection node for reading signal charges stored at said photoelectric conversion means, and

wherein said vertical driving means supplies a reset signal for driving said reset means prior to said read driving signal.